



U.S. Department of Energy
Office of Civilian Radioactive Waste Management



DOE/NRC Performance Indicators Technical Exchange Meeting

Las Vegas, Nevada

May 3, 2004

Agenda
DOE/NRC Performance Indicator Technical Exchange
May 03, 2004
8:00 AM – 3:00 PM (PT)
11:00 AM – 6:00 PM (ET)

BSC
Room 915
9960 Covington Cross
Las Vegas, Nevada

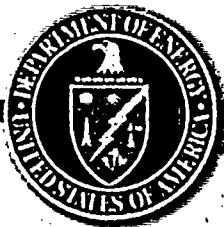
And via Videoconference to:

U. S. Nuclear Regulatory Commission
Two White Flint North, Auditorium
11545 Rockville Pike
Rockville, MD

CNWRA
Bldg. 189, Conference Room B232
6220 Culebra Road
San Antonio, TX

*INTERESTED PARTIES MAY PARTICIPATE VIA TELECON BY CALLING 1-800-638-8081 or
301-231-5539, Passcode 0358#*

| | | |
|-----------------|--|--------------------------------------|
| 8:00 AM | Introduction and Opening Remarks | DOE/NRC |
| 8:15 AM | Performance Indicators at YMP - Background | Spence/Sorensen |
| 8:45 AM | Relationship to Industry Programs | Corbet |
| 9:30 AM | Break | All |
| 9:45 AM | Architecture of Performance Indicators | Wagner |
| 10:30 AM | Example of Specific Performance Indicators | Cereghino |
| 11:45 AM | Lunch | All |
| 1:00 PM | Example of Specific Performance Indicators (con't.) | Carmichael/ Wagner/ Grant |
| 2:30 PM | Public Comments | Public |
| 2:45 PM | Closing Remarks | NRC |
| 3:00 PM | Adjourn | All |



U.S. Department of Energy
Office of Civilian Radioactive Waste Management



Performance Indicator Overview

Presented to:

DOE/NRC Performance Indicators Technical Exchange

Presented by:

Richard E. Spence

Director, Office of Performance Measurement and Improvement
Office of Repository Development
U.S. Department of Energy

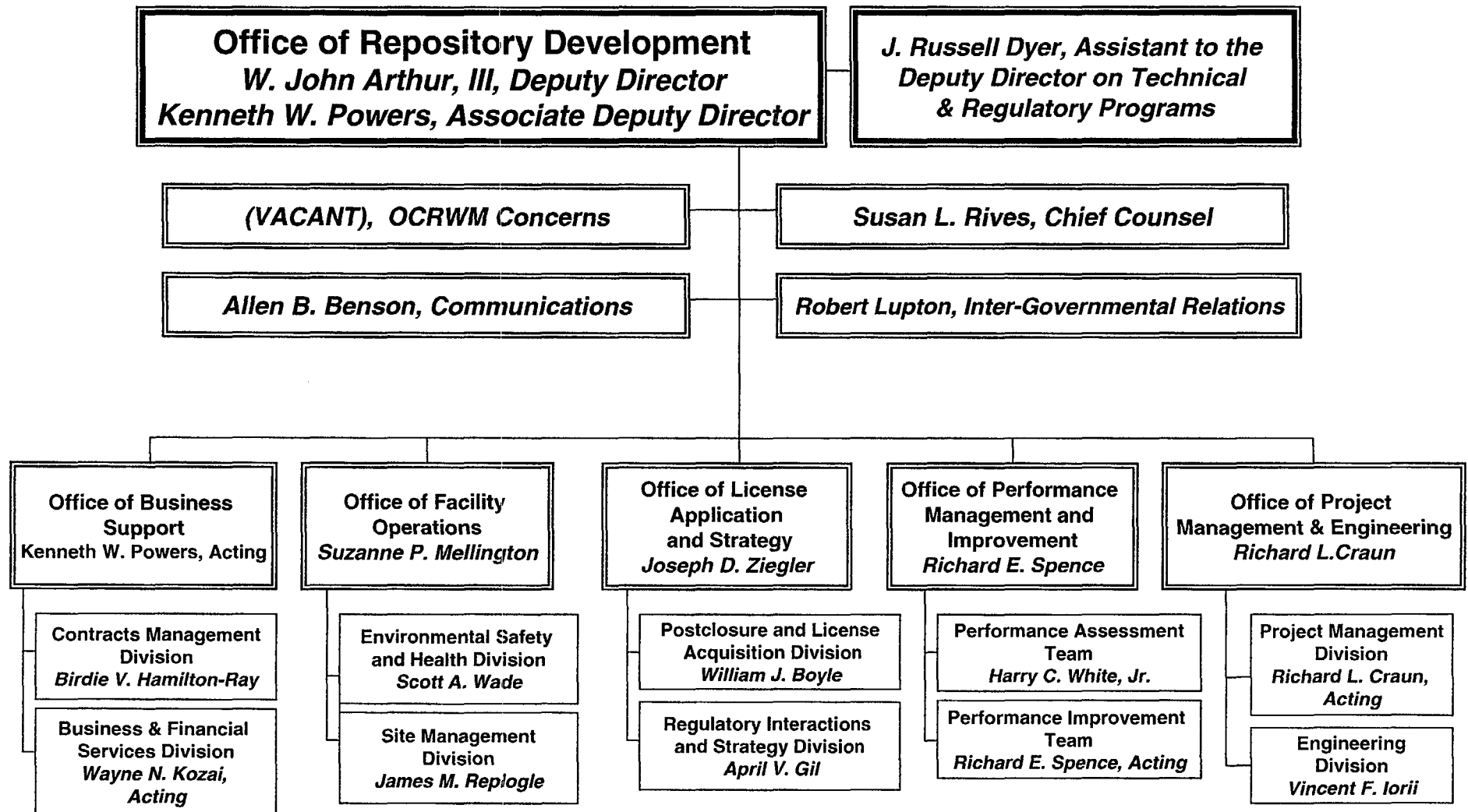
Dennis Sorensen

Manager, Organizational Assurance
Bechtel SAIC Company, LLC

May 3, 2004

Las Vegas, Nevada

Office of Repository Development



Performance Indicator System

- **Background**
 - Got started
 - Comprehensive concept
- **Integrated project management tool**
 - Accountability and management by exception
 - Efficiency and effectiveness
 - Culture change
- **3 major areas**
 - Work execution
 - Management
 - Focus areas



Performance Indicator System

(Continued)

- **With over 8 months of history, major cultural changes include:**
 - Revised quality assurance (QA) platform
 - Instituted human performance improvement portfolio
- **Future and ongoing initiatives:**
 - Performance Improvement International (PII) and consultant evaluations, self-assessments, QA audits/evaluations
 - Minimize subjective indicators, near term focus
 - Next project phase - work execution to assets



Performance Indicator System

(Continued)

- **Balance of Technical Exchange agenda**
 - **Technical basis and key supporting concepts**
 - **Architecture**
 - **Examples**





Yucca Mountain Project Performance Indicator System as Designed by Performance Improvement International

Technical Basis and Key Supporting Concepts

NRC Technical Exchange

May 3, 2004

**Catherine C. Corbett
Senior Partner, PII**

Yucca Mountain Project Performance Indicator System

***Begin with the End in Mind
Comparison to Best Practice Systems****

(*Identified by Performance Improvement International (PII) in Research and Case Study Projects)

Best Practice Performance Strategies for Management Monitoring Systems



Monitoring systems that drive achievement of Critical Missions and Goals have these elements in common:

- 1) Mission and goal statements for all organizations
- 2) Behavior-based expectations derived from the mission
- 3) Strong accountability system to reinforce expected behaviors
- 4) Work prioritization based on mission-critical functions
- 5) **Performance monitoring systems to measure progress**

First Question!



What should be measured?

Answer: Aspects of performance that indicate how well the organization is succeeding in pursuit of:



- ☐ strategic direction,
- ☐ mission critical functions,
- ☐ key stakeholder issues, and
- ☐ efficiency and effectiveness of critical support functions

Second Question



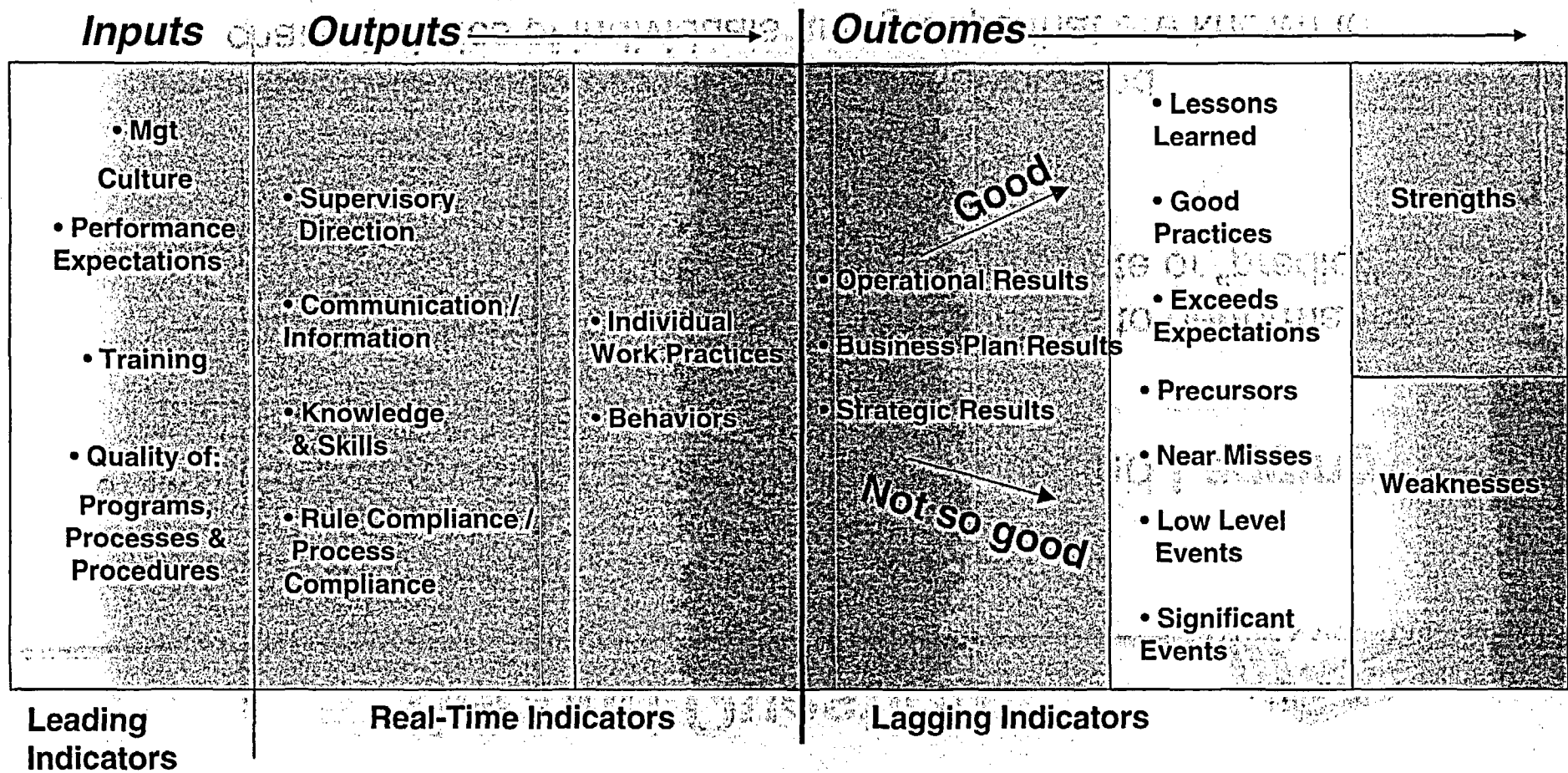
How should performance be measured?

- Better balance in **Leading, Real-time** and **Lagging** indicators of performance:
 - **Leading Indicators:** Measure critical inputs to performance outcomes, providing the capability to anticipate or “predict” future performance.
 - **Real-time Indicators:** Measure behaviors and characteristics of individuals and groups that are known to produce specific outcomes.
 - **Lagging Indicators:** Measure performance results that have already occurred.

Third Question



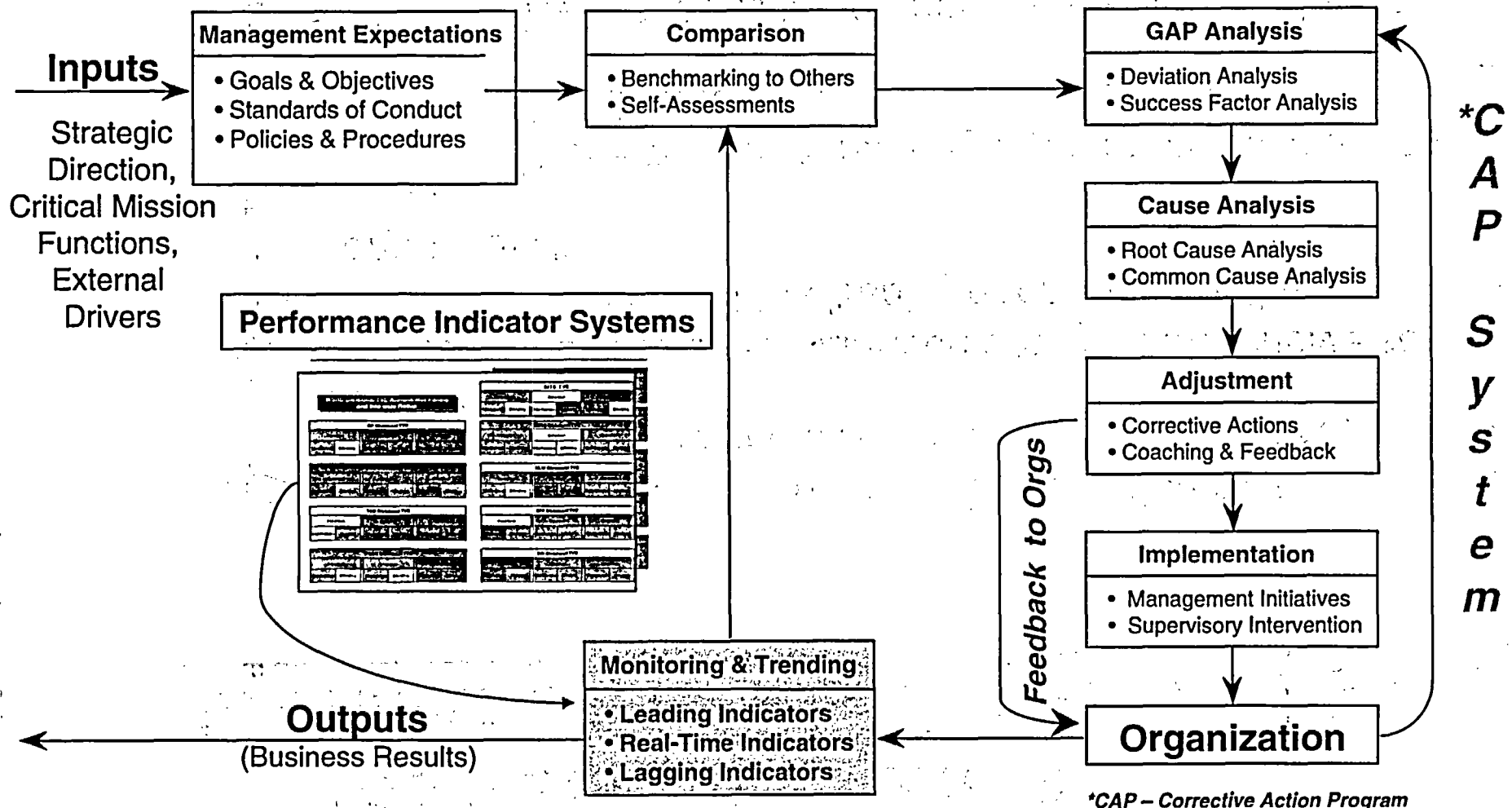
What are examples of these types of measures?



How do they fit together?







In an Integrated Performance Management System



Top 4 Success Factors in Effective Indicator Systems

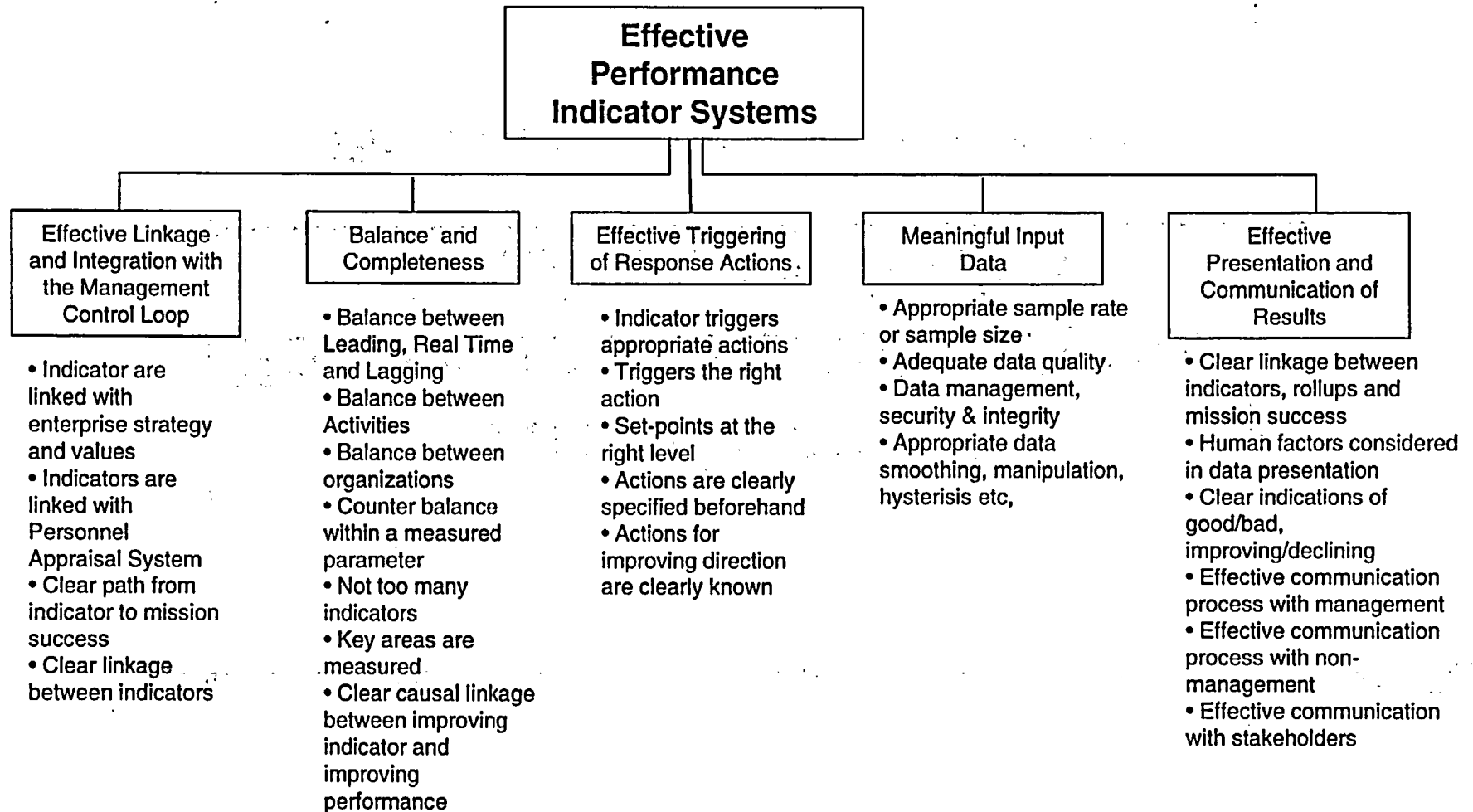


-  **85%** Performance Indicator System identifies key areas of decline (Cause & Effect Linkage)
-  **40%** Indicators are balanced and comprehensive so as to reflect the “real” performance of the organization
-  **23%** Performance monitoring triggers effective actions that do not overburden the organization
-  **13%** Trends identified do not lag real-time performance so much that problems over-run the organization before interventions can be initiated

Typical Success Factors



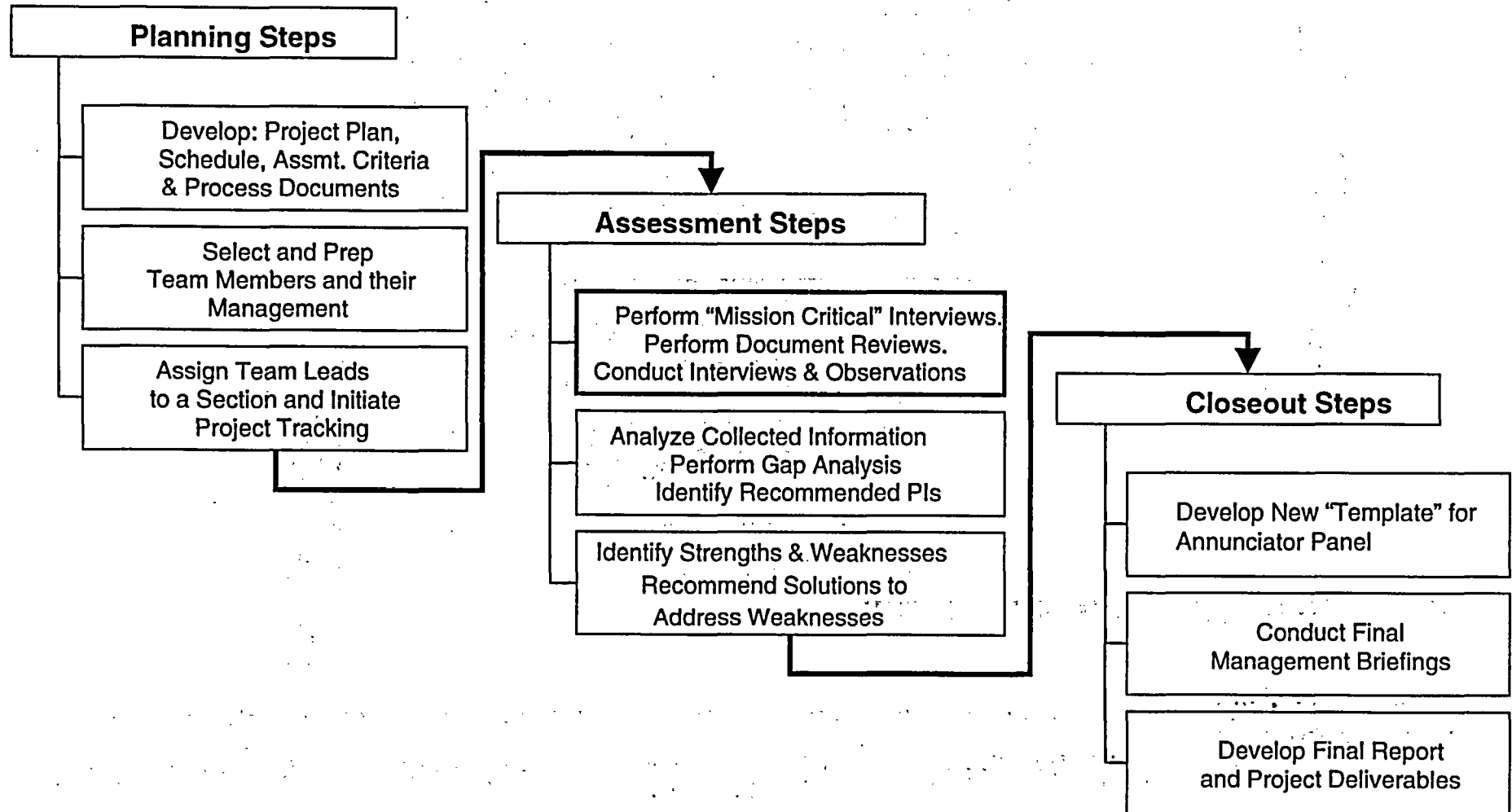
(Identified by Performance Improvement International (PII) in Key Research Projects)



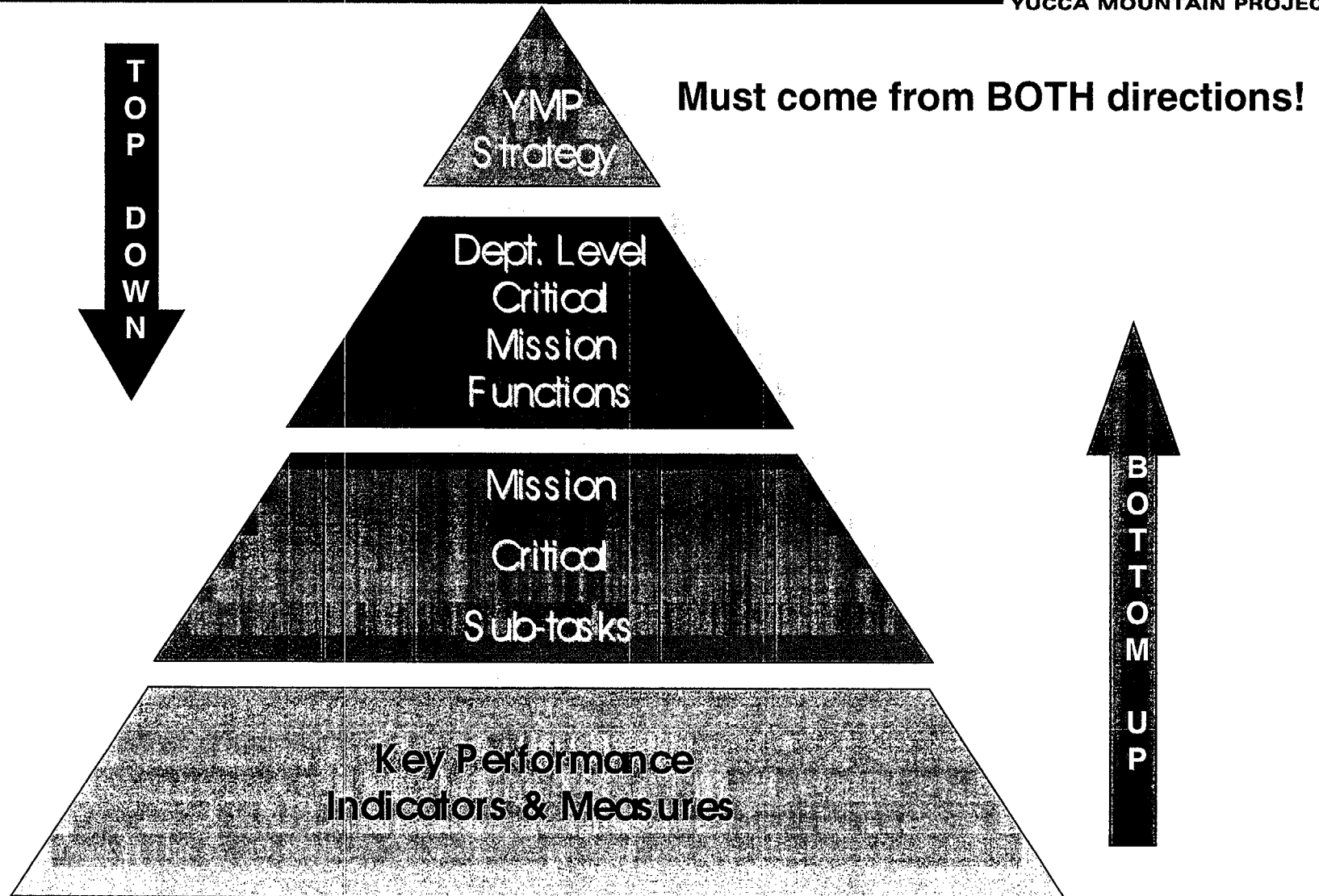
Yucca Mountain Performance Indicator System Development Project

The Process for Designing the System

Indicator System Development



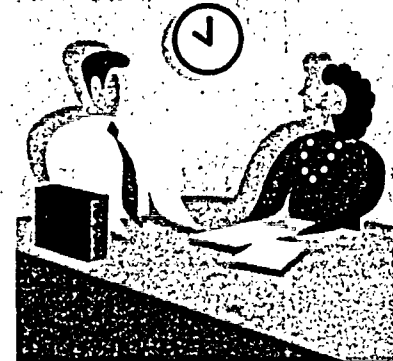
Linkage of Mission-Critical Functions



Gathering Critical Information



For example, in one step, interviews were used to collect information important to the functions of the various organizations:



- Interviews were conducted with all mission-critical groups
- Middle managers were interviewed for input
- Supervisor and worker level input was incorporated where necessary to determine indicator inputs and data integrity
- Senior management was interviewed for consistency of mission-critical objectives and supporting functions

Input: Gathering Critical Information



Sample Interview Questions:

- What is the mission of your organization in support of Yucca Mountain Project?
- What are the three or four most critical functions you perform in support of that mission?
- What are the key activities performed and work products produced in support of those functions?
- What do you use as your own management “early warning” notice for problems in your area?



Output: Mission Critical Functions

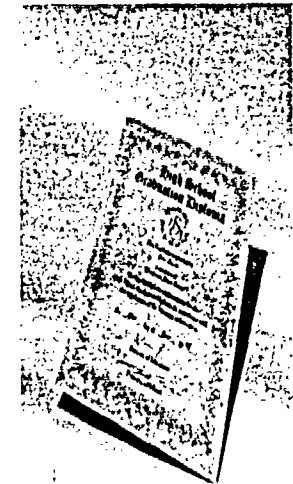


Example: Licensing Functions

Licensing Functions must be timely, accurate and complete.

Some of the Mission Critical Functions for Licensing are:

1. **Timely and Accurate License Application Section Development**
 - Accuracy and Quality of the License Application Sections Produced
 - Timely completion of the required activities for the License Application Section
2. **Effective Licensing Interactions with the NRC**
 - Develop and maintain a 'positive' regulatory relationship with margin
3. **Effective Implementation of the Licensing Support Network**
 - Timely submittal of records to the Litigation Support Contact
4. **Effective Management of NRC Commitments**
 - Ensure response letters are transmitted on time
 - Ensure commitments are delivered on time
 - Ensure response letters are clear, understandable and complete
 - Develop realistic and achievable commitment dates
4. **Timely and Efficient Resolution of Key Technical Issues**
 - Provide accurate and complete responses to Key Technical Issues
 - Provide timely responses to Key Technical Issues



Yucca Mountain Performance Indicator System Development Project

Development of Indicators in the System

Key Criteria for Developing Effective Indicators



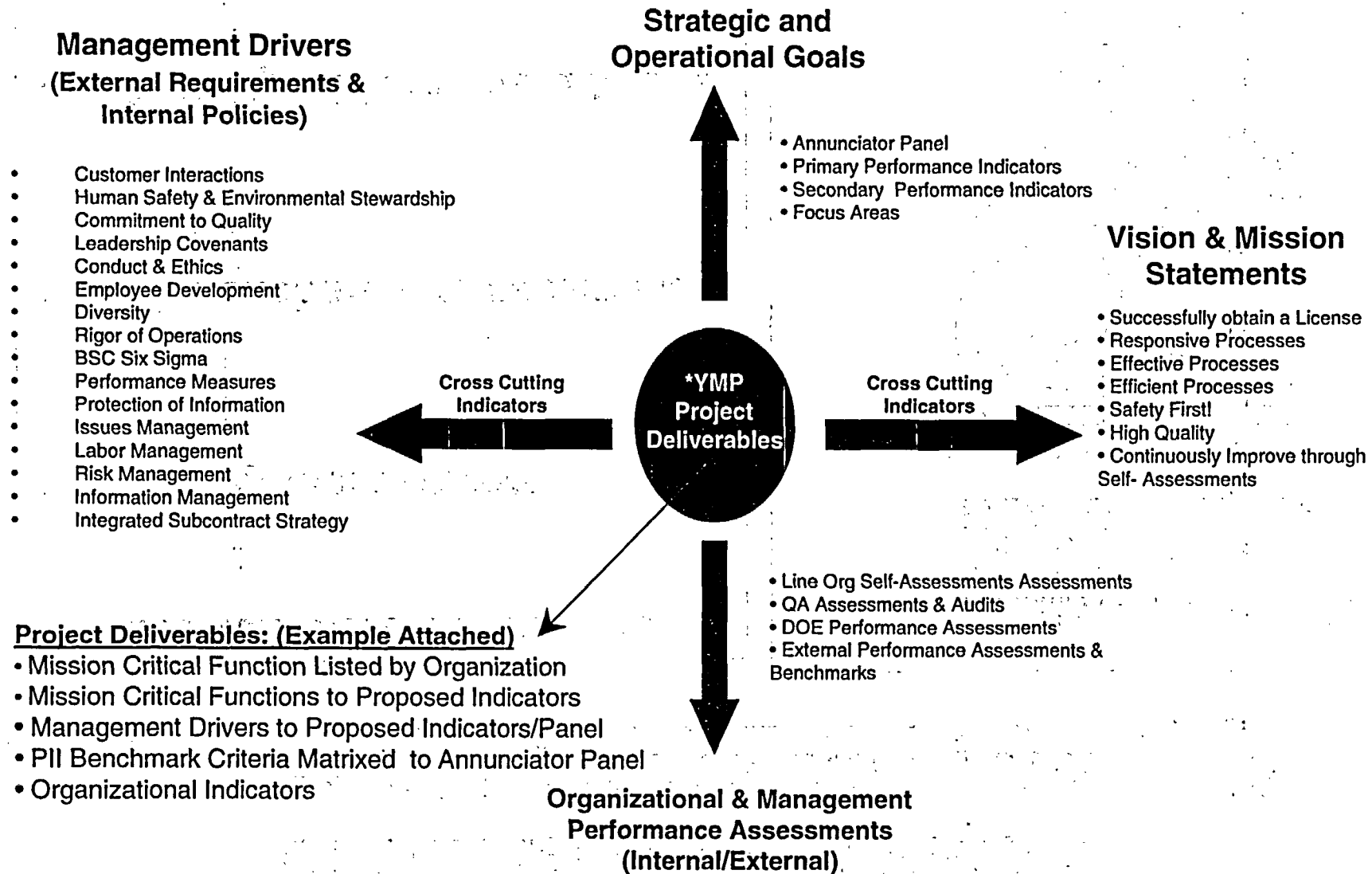
- Linkage and Integration with Mission Critical Functions
- Balance and Completeness within the System
- Triggering of Actions
- Meaningful Input Data
- Communication and Presentation of Results

Evaluating Linkage and Integration



- Evaluated the linkages of each performance indicator to other indicators, using a stream analysis to determine which are resultants and which are drivers
- Evaluated integration of indicators with: enterprise strategy, value statements, balanced scorecard, etc.
- Evaluated integration with personnel performance appraisal system to drive links to **individual and group accountability**
- Traced a path from any indicator to the ultimate success of the mission

Linkage & Integration of Indicators into the Management Monitoring System



Understanding Linkage of Panel Inputs to the System



• Mission Critical Functions

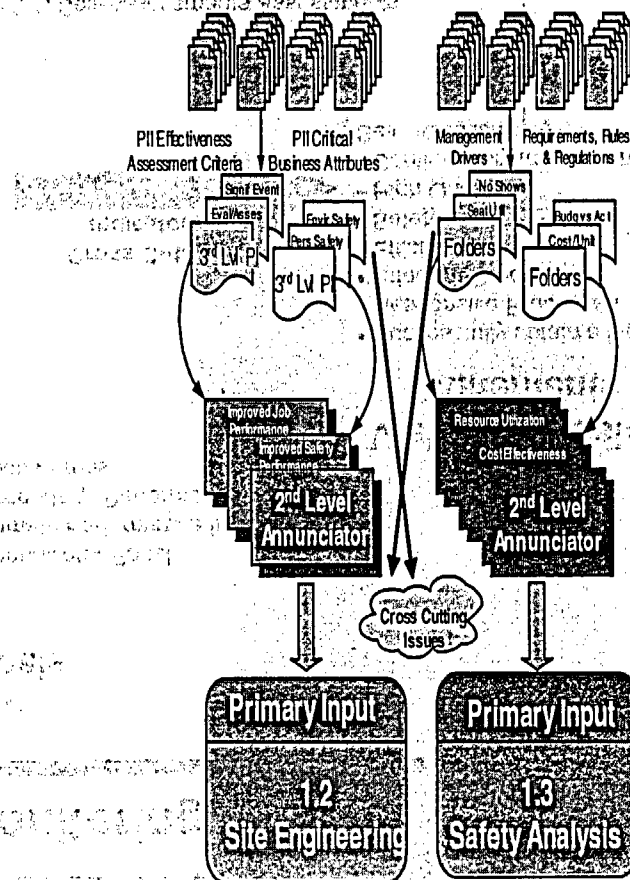
• Management Drivers

• PII Benchmark Assessment Criteria

4. Dept. Specific Inputs & Needs

5. Management Specific Inputs

Tracing the Links from Input to Indicator



Conceptual Design

YMP Success

Work Execution



Primary

Timely, Accurate and Complete
Licensing Activities

Secondary

Timely and Accurate
License Application
Section Development

Effective Licensing
Interactions with
the NRC

Effective Use of
the Licensing
Support Network

Effective Management
of Commitments

Timely and Efficient
Resolution of Key
Technical Issues

Level 3

License
Application
progress
consistent with
schedule

License
Application
Section Quality

Ensure that a
continuous
meeting program
is maintained
with the NRC

Ensure that
licensing
interactions
with the
NRC meet
the
objectives

Timely submittal
of records to
Litigation Support
Contract

Ensure response
letters are
transmitted on
time

Ensure
Commitments
are delivered on
time

Ensure
Response letters
are clear,
understandable
and complete

Develop accurate
initial
commitment
dates

Provide accurate
and Complete
Responses to
Key Technical
Issues

Provide Timely
responses to Key
Technical Issues

Variance of
Actual Progress
compared to
schedule

Subjective
Evaluation

of actual
meetings divided
by scheduled
meetings

Subjective
Judgment of
% of
successful
meetings

of actual
divided by #
scheduled
-Databases
- RMS
-Unprocessed
-E-Mail

of >45 day
late DOE
OLAS to NRC
letters

% late
commitments

% of response
letters that got an
NRC Comment
Letter

% of
commitments
having a changed
or renegotiated
due date

% of KTI for
which the NRC
requests
additional
information

Actual # of
submittals
compared to
scheduled
submittals

Cross Cutting Indicators

| | | | | | | | | | | | | |
|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Strategic Goals | | | | X | X | | | | | | | |
| Production | X | X | | | | X | X | X | X | X | X | X |
| Performance | | | | | | | | | X | | | |
| Process/ System Health | | | | | | | | | | | | |
| Safety Culture | | | | | | | | | Leading | | | |
| Quality | | Lagging | | Lagging | | | | Lagging | Lagging | Lagging | | |
| Schedule/ Timeliness | Lagging | Leading | Lagging | Leading | Lagging | Lagging | Lagging | | Leading | | Lagging | |
| Personnel Safety | | | | | | | | | | | | |
| Efficiency/ Cost | | Leading | | Leading | Leading | | | | | | | |
| Environment | | | | | | | | | | | | |
| Public Safety | | | | | | | | | | | | |
| Stakeholder Confidence | | Leading | Lagging | Lagging | | Leading | Leading | Leading | Leading | Leading | Leading | Leading |

Balance and Completeness

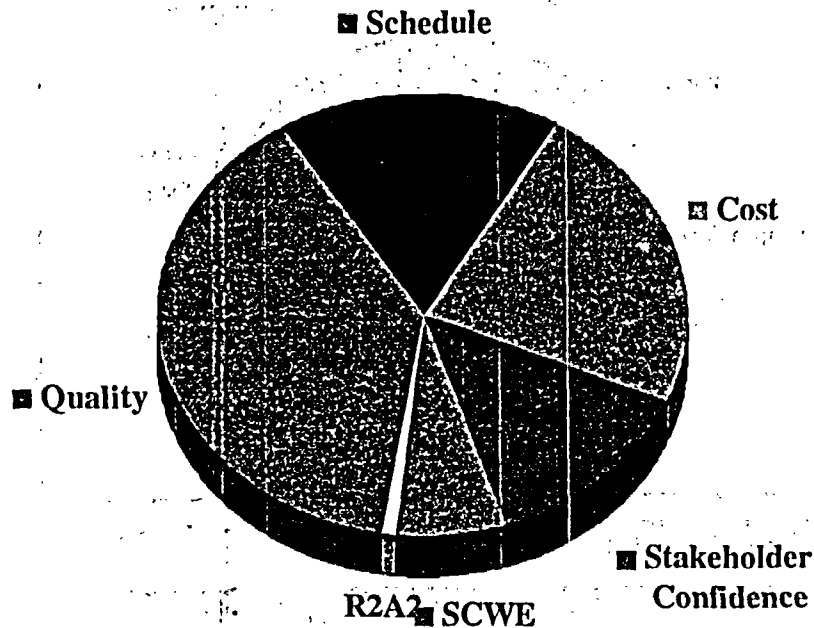


- Evaluate the balance and completeness of the indicator system based on the following:
 - Balance between Leading, Real Time and Lagging indicators
 - Balance between Strategic, Production, Performance and System/ Process Health indicators
 - Balance between organizational entities
 - Completeness of coverage in mission-critical functions and their impact areas
- Evaluate the counter-balancing of indicators to ensure that there are no unintended consequences (i.e. reduction in low level problem reports)
- Test the indicators for causal linkages for success of the mission
- Use Organizational, Programmatic and Management failure modes to assist in determining if the set of indicators is complete

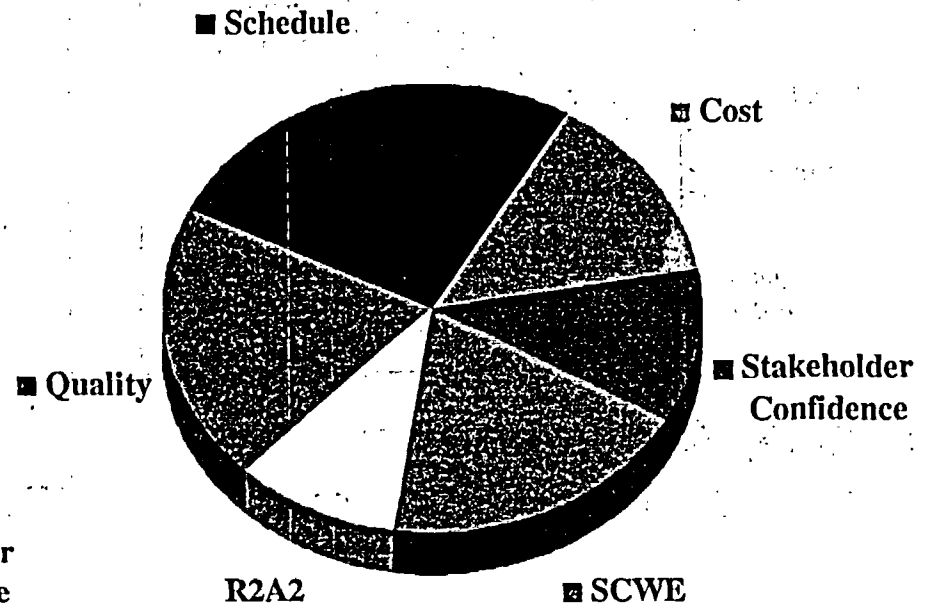
Some Areas Were in Need of Better Balance in Topics



“Before” Balance in Inputs to Cross Cutting Issues



“After” Balance in Inputs to Cross Cutting Issues

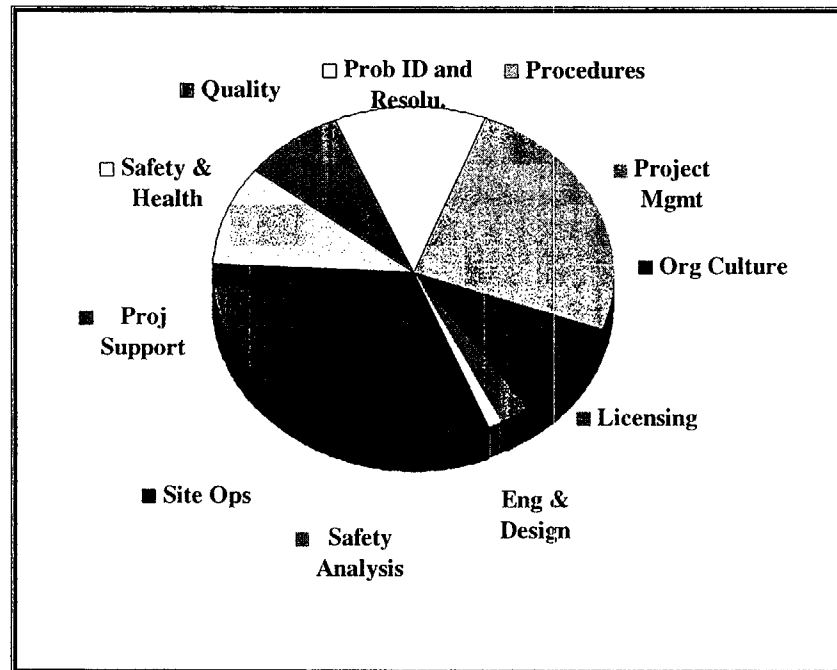


■ Cost ■ Stakeholder Confidence ■ SCWE R2A2 ■ Quality ■ Schedule

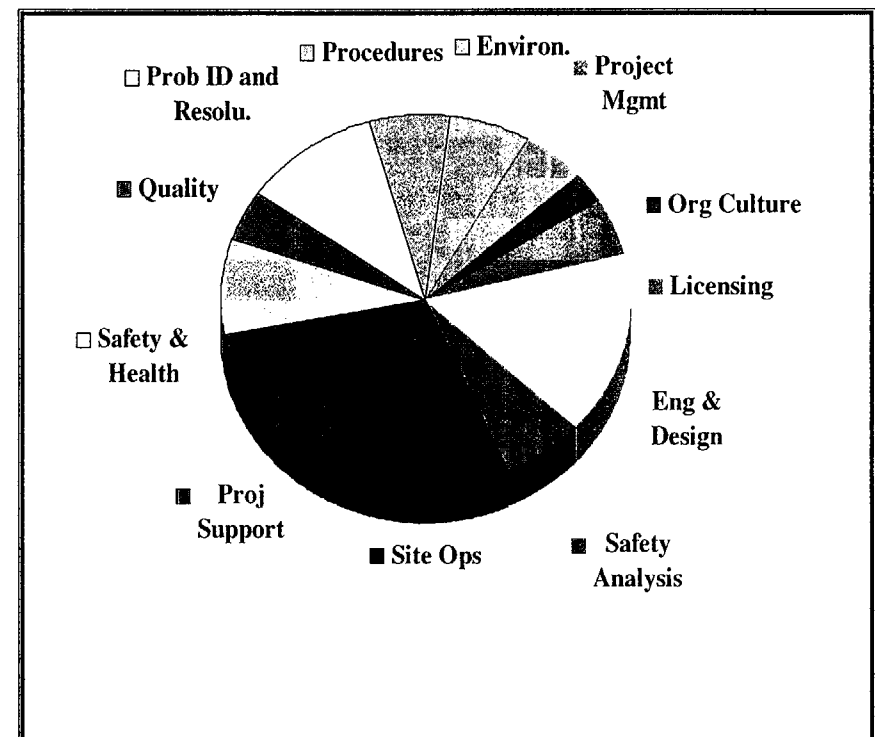
Some Depts. Were in Need of Better Balance Representation



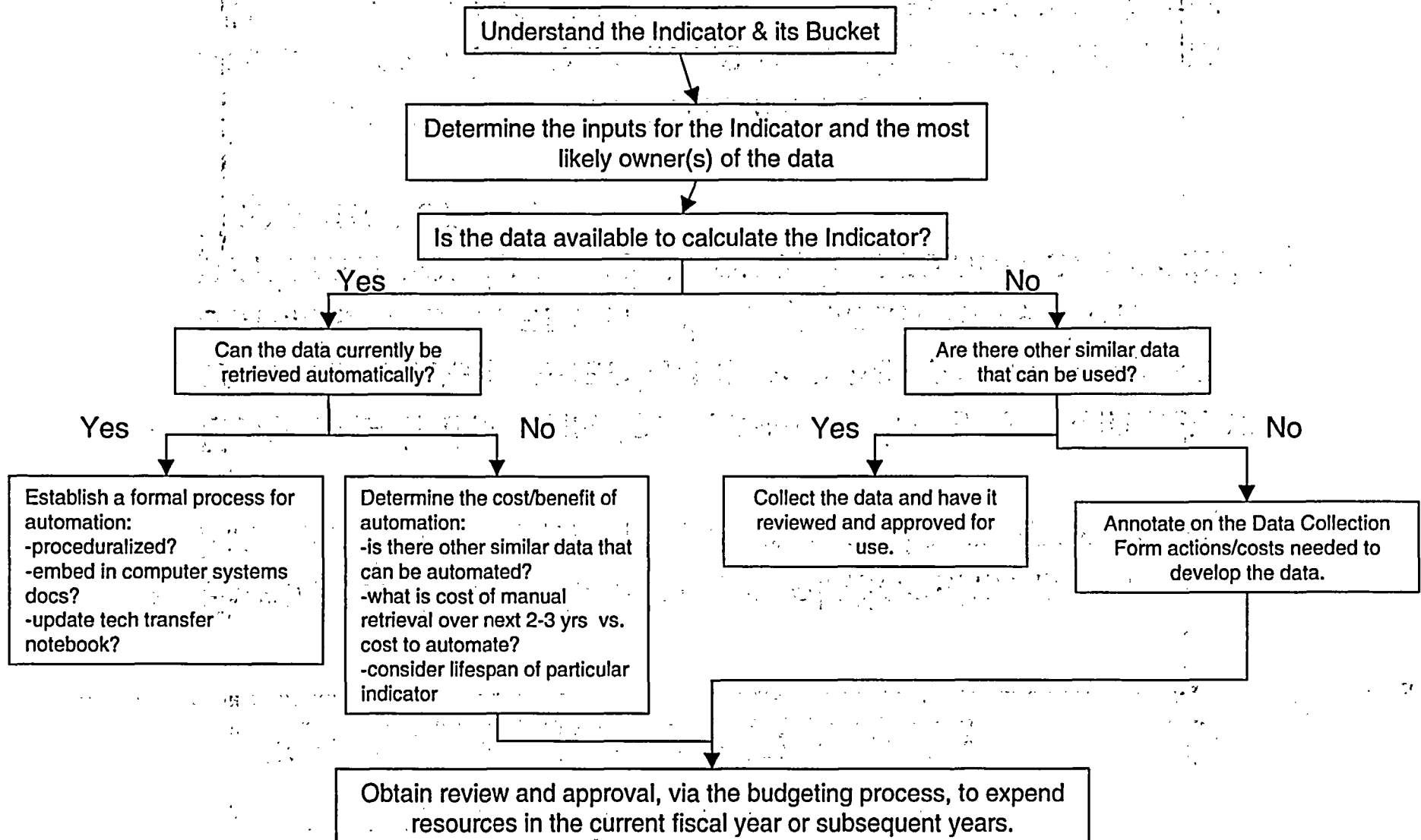
“Before” Balance in Inputs from YMP Functional Groups



“After” Balance in Inputs from YMP Functional Groups



Indicator Data Collection Flowchart



Communication and Presentation of Results

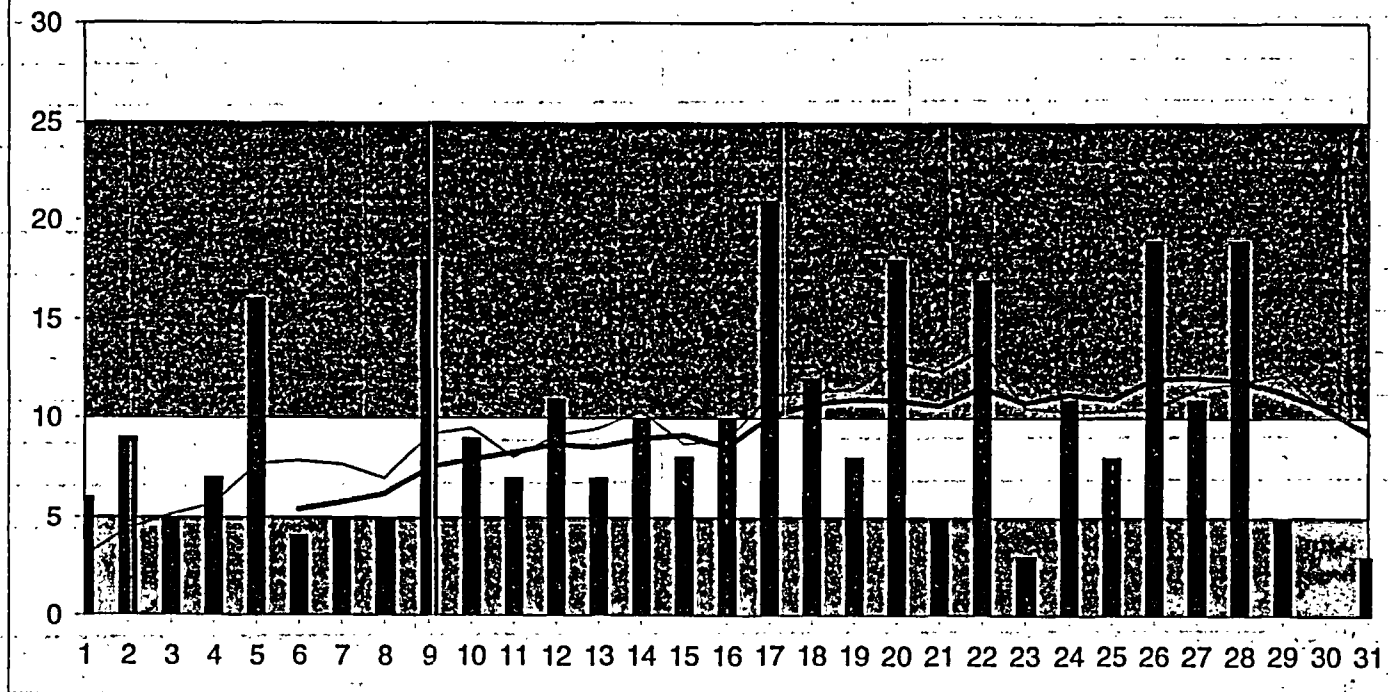


- Evaluate if there is a clear relationship between the individual PIs and the overall performance rollup
- Evaluate if the charts, presentations, annunciators and data are presented in a clear fashion so an outside observer can clearly determine if the performance is good or bad, improving or declining, important or not.
- Evaluate if both management and non-management populations can state the top 3 areas where performance does not meet expectations.

Example Indicator Outputs



D - Days Late - Example of Different Methods
(Crossing Averages)



Example Indicator Trends

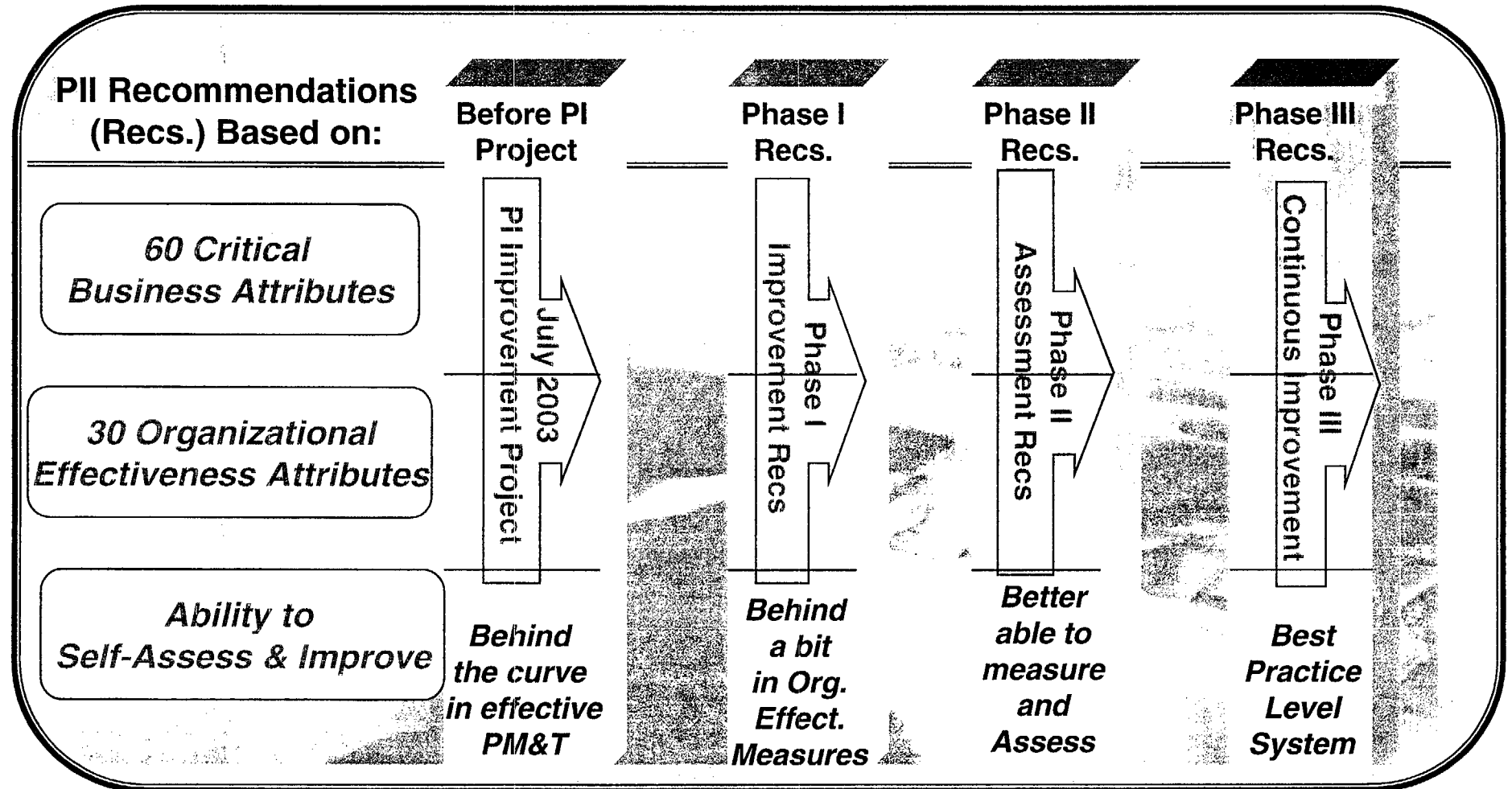


| | Monthly | 6 Month Average | 12 month Average | Crossing Average Trend Direction | Numerical Trend Direction |
|----|---------|-----------------|------------------|--|------------------------------|
| 6 | | | | ↓ | |
| 7 | | | | ↓ | ↓ |
| 8 | | | | ↓ | -- |
| 9 | | | | ↓ | ↓ |
| 10 | | | | ↓ | ↑ |
| 11 | | | | -- | ↑ |
| 12 | | | | ↓ | ↓ |
| 13 | | | | ↓ | ↑ |
| 14 | | | | ↓ | ↓ |
| 15 | | | | ↑ | ↑ |
| 16 | | | | ↓ | ↓ |
| 17 | | | | ↓ | ↓ |
| 18 | | | | ↓ | ↑ |
| 19 | | | | ↓ | ↑ |
| 20 | | | | ↓ | ↓ |
| 21 | | | | ↓ | ↑ |
| 22 | | | | ↓ | ↓ |
| 23 | | | | ↑ | ↑ |
| 24 | | | | ↑ | ↓ |
| 25 | | | | ↑ | ↑ |
| 26 | | | | ↑ | ↓ |
| 27 | | | | ↑ | ↑ |
| 28 | | | | ↑ | ↓ |
| 29 | | | | ↓ | ↑ |
| 30 | | | | -- | ↑ |
| 31 | | | | presentation - NRC Meeting 5-3-05.ppt | ↓ |

Yucca Mountain Project Performance Indicator System

Key Factors in Implementation of the System

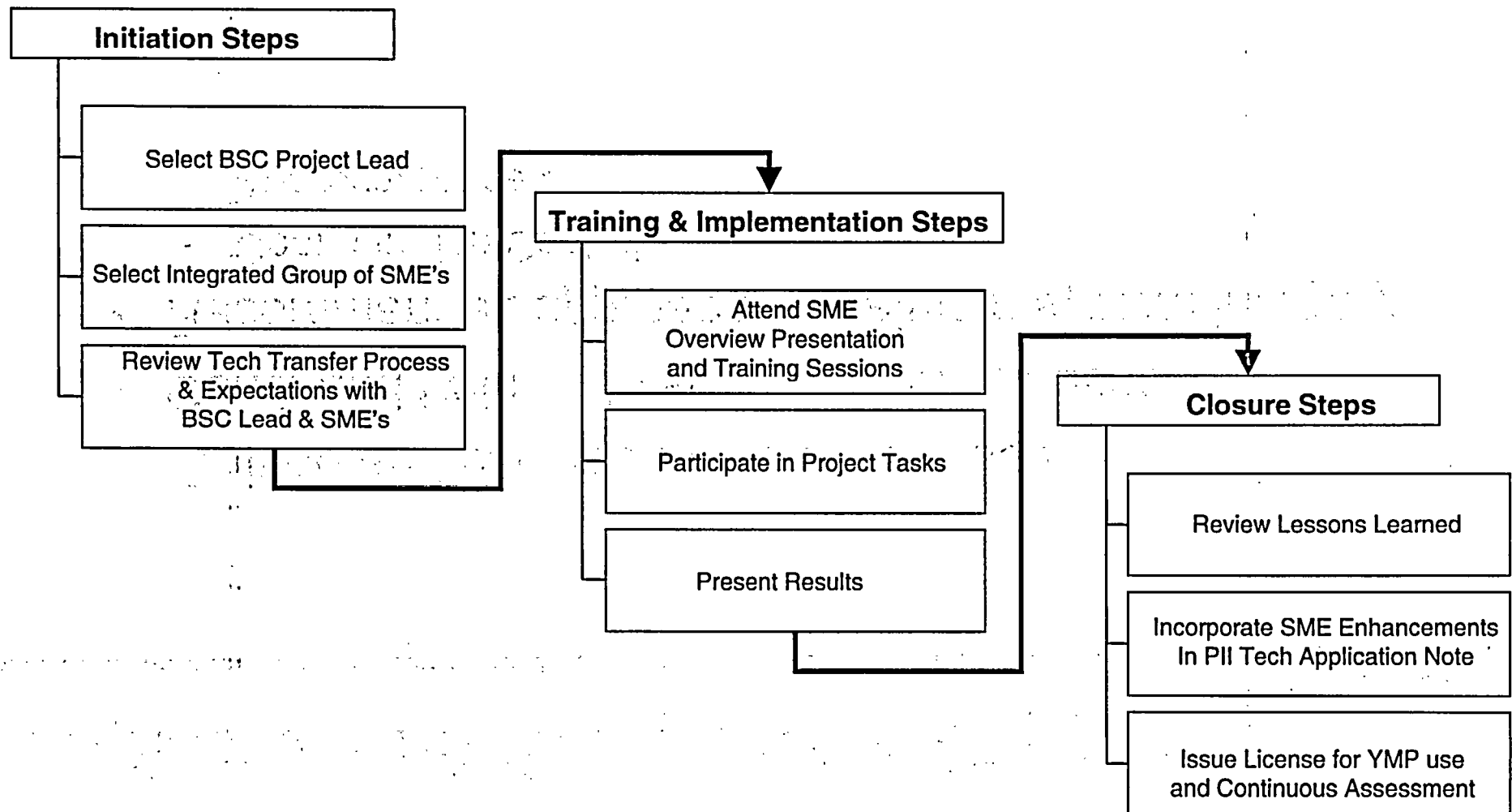
Phased In Approach



Tech Transfer Process Completed



To ensure continuous improvement & assessment of the system



Implementing Guidelines & Support



- Trained and certified for continued use
- Continued training to support future phases
- Recommended approach to maintain system integrity
 - Configuration Control
 - Approval process

Phased-In Approach: Triggering of Actions



- Evaluate the connection between the PIs and internal and external triggering of actions.
- Ensure there is a clear connection to the management control loop.
- Evaluate if a clear action response exists for both high and low triggers from the PIs
- Evaluate if the trigger points or action bands have been set at realistic and meaningful levels
- Identify several possible "trigger" responses (i.e. Six Sigma Team Project, Tiger Team Project, Root Cause Analysis, etc.)

Phased-In Approach: Example Triggering Worksheet

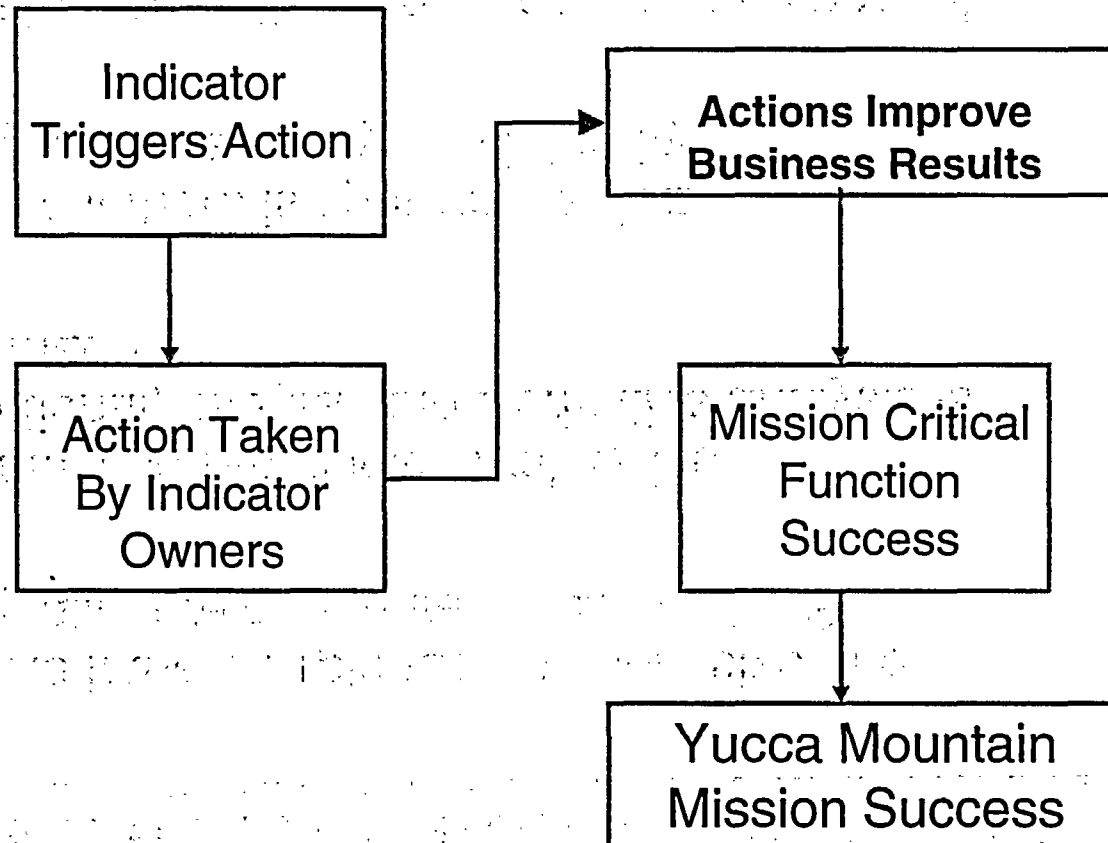


| Indicator | Declining performance set-point | Action to be taken on declining set-point | Improving performance set-point | Action to be taken to raise the performance standard |
|-----------|---------------------------------|---|---------------------------------|--|
| | | | | |
| | | | | |
| | | | | |

Phased-In Approach: Triggering of Actions



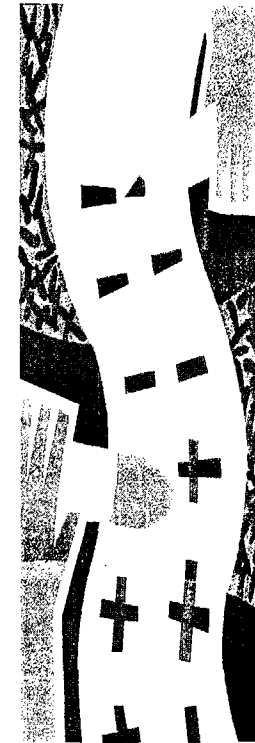
Actions are triggered based on pre-determined response strategy.



Assessment Opportunity: Assure Meaningful Input Data



- Evaluate if the sample rate, sample size and data quality are adequate for use in the PI
- Evaluate if correct choices related to Proportional, Integral and Derivative analysis is being made
- Evaluate if there is appropriate data management, security and integrity
- Evaluate if smoothing, over control, and normal regression or oscillations are accommodated appropriately



Assessment Opportunity: Performance Indicator Quality Checklist



- Is the performance target objectively measurable?
- Is it verifiable and auditable?
- Are there biases, exaggerations, omissions, or errors that are likely to make it inaccurate or misleading?
- Is the indicator resistant to manipulation or perverse behavior?
- Does it identify gaps between current status and the underlying objective?
- Does it provide a CLEAR indication of progress towards the objective?
- Can it be trended to show progress over time?
- Is it benchmark-able (either to others or a baseline measurement?)
- Is it within management's ability to control the outcome?
(Can management affect a positive change in a short timeframe with specific action?)
- Is the data cost effective to collect?



Summary and Closing Remarks

YMP Performance Indicator Improvement Project

Developed by Performance Improvement International

Implementing Guidelines & Support



Continued Support and Configuration Control for the Performance Annunciator System was Designed in at the Start

- Subject matter experts (5) within the YMP organization were trained by PII and worked along side us in development of the indicator system.
- A plan was developed for support from PII during multiple phases of implementation. The plan included orientation training for new SME's and continuous assessment of the system. This year, continuing education was added to the plan so that YMP will be able to perform future assessments of the system.
- A complete technical transfer of system documents was developed by PII in support of the project and was given to each SME and the key Project leads for YMP.
- A report detailing development of the final "proposed" indicators and a desktop guide replicating the process were provided as deliverables.
- A configuration control process was developed by YMP to ensure that control over changes to the indicators is maintained at an appropriate level.



U.S. Department of Energy
Office of Civilian Radioactive Waste Management



www.ocrwm.doe.gov

Performance Indicator Architecture

Presented to:

DOE/NRC Performance Indicators Technical Exchange

Presented by:

Cynthia Wagner

Project Manager, Organizational Assurance

Bechtel-SAIC Company, LLC

May 3, 2004

Las Vegas, Nevada

Performance Indicator Architecture

- **Performance Indicator System**
 - **Architectural structure**
 - ◆ **Prototype**
 - ◆ **Integrity and fairness of representation**
 - ◆ **Dashboard with diagnostic drill-down capabilities**
 - **Web site**
 - ◆ **Annunciator Panel**
 - ◆ **Training module**
 - ◆ **Governing documents**
 - ◆ **Support/resources**



Performance Indicator Architecture

(Continued)

- **Performance Indicator System** (Continued)
 - **Internal controls**
 - ♦ Centralized change control
 - ♦ Formal approval process
 - ♦ Predefined rules for “overrides”
 - ♦ Limited access to operating components
 - **Maintenance/improvement**
 - ♦ Collaborative agreement between DOE/BSC
 - ♦ Feedback from Leadership Council, Management Operating Review, Trending Reports, Corrective Action Program (CAP), Self-Assessments, Lessons Learned, etc.
 - ♦ Trained subject matter experts facilitate DOE/BSC line organizations



Performance Indicator Architecture

(Continued)

- **Architecture**
 - **Drill-down structure**
 - ◆ **Hierarchy of key performance indicators**
 - » **Primary roll-up metrics**
 - » **Secondary roll-up metrics**
 - » **Tertiary roll-up metrics**
 - » **Base metrics**
 - ◆ **Transparent and reliable results**
 - » **Base metrics report actual results**
 - » **“Overrides” applied only to secondary metrics**



Performance Indicator Architecture

(Continued)

- **Architecture** (Continued)

- **Communication**

- ♦ **Standardized 4-point scale: blue, green, yellow, and red**
 - ♦ **Historical performance**
 - ♦ **Performance trends**
 - ♦ **Rolling averages versus monthly data points**
 - ♦ **Management attention flags**
 - ♦ **Graphic representation of data results**
 - ♦ **Analysis and required actions (what, how, why, and when)**



Performance Indicator Architecture

(Continued)

- **Metric Definition Sheets (MDS)**
 - **Collaborative development**
 - ♦ **Metric attributes predefined and preapproved**
 - » **Definition**
 - » **Performance thresholds and goals**
 - » **Calculations**
 - » **Data source**
 - » **Roll-up families**
 - » **Weightings**



Performance Indicator Architecture

(Continued)

- **Base Metrics**

- **Purpose**

- ♦ **Measurement of key performance attributes**
 - » Timeliness, quality, or effectiveness
 - ♦ **Drive specific performance**
 - » Thresholds
 - » Weightings
 - ♦ **Provide the ability to diagnose overall performance**
 - » Actual performance results
 - » Leading and lagging implications
 - » Supervisor's analysis and required actions



Performance Indicator Architecture

(Continued)

- **Tertiary Roll-up Metrics**

- **Purpose**

- ♦ Consolidate the “critical many” into the “critical few”
 - ♦ Funnel results into balanced sets, or sets of common attributes
 - ♦ Normalize results to standardized 4-point scale
 - » Blue: ≥ 3.5
 - » Green: $< 3.5 \geq 2.5$
 - » Yellow: $< 2.5 \geq 1.5$
 - » Red: < 1.5
 - ♦ Consolidated analysis and required actions by midlevel management



Performance Indicator Architecture

(Continued)

- **Secondary Roll-up Metrics**

- **Purpose**

- ♦ **Key performance indicators - provide overall measure of products and outcomes critical to mission success**
 - ♦ **Aggregate scores from tertiary roll-up metrics or base metrics using the same standardized 4-point scale**
 - » **“Overrides” occur at this level (i.e., “blue rule”)**
 - ♦ **Consolidated analysis and required actions by responsible area managers**



Performance Indicator Architecture

(Continued)

- **Primary Roll-up Metrics**
 - **Purpose**
 - ◆ **Primary performance indicators - provide overall measure of the critical products and outcomes necessary for mission success**
 - ◆ **Aggregate scores from secondary metrics to the same standardized 4-point scale**
 - ◆ **High-level consolidated analysis and required actions by responsible area managers**



Performance Indicator Architecture

(Continued)

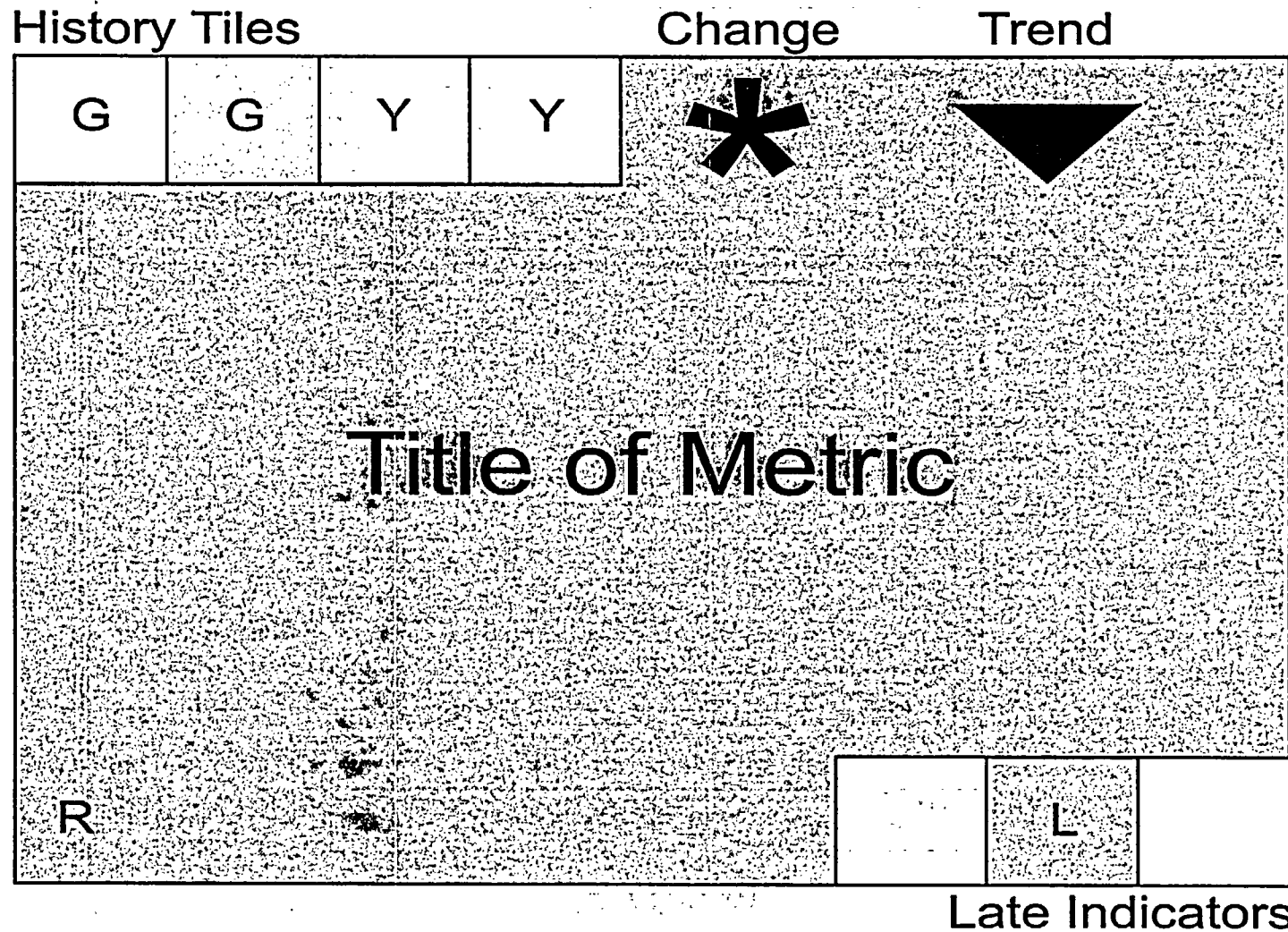
- **The Yucca Mountain Project Dashboard**
 - **Future development**
 - ♦ **Revised Annunciator Panel by January 2005**
 - ♦ **Work execution refocused**
 - ♦ **Management Execution: continuous focus on programs and processes; emphasis on support services for refocused work execution**



Backup



Performance Indicator Architecture



Performance Indicator Architecture

(Continued)

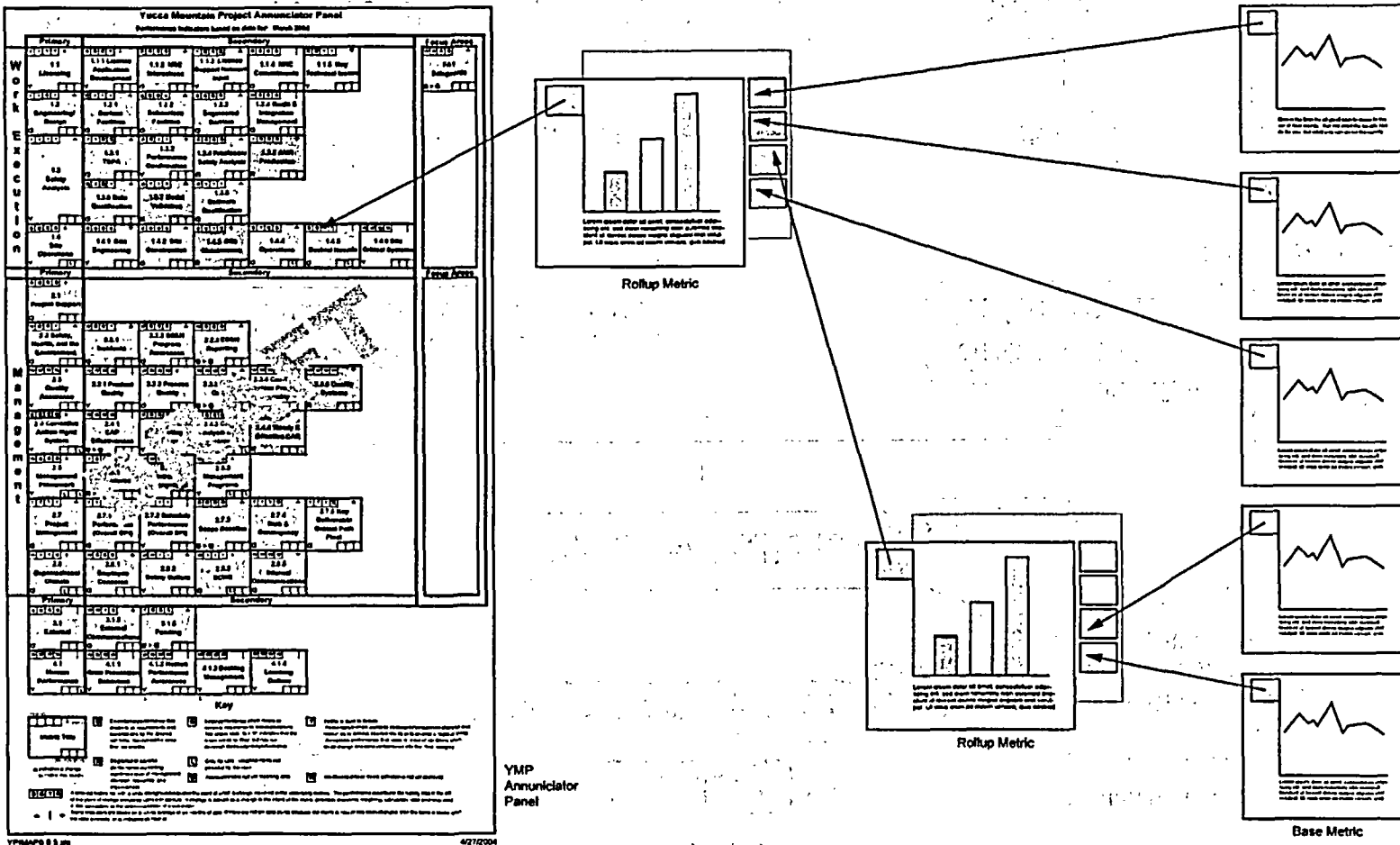
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10/08/2003
Rev. 0



Performance Indicator Architecture

(Continued)



Performance Indicator Architecture

(Continued)

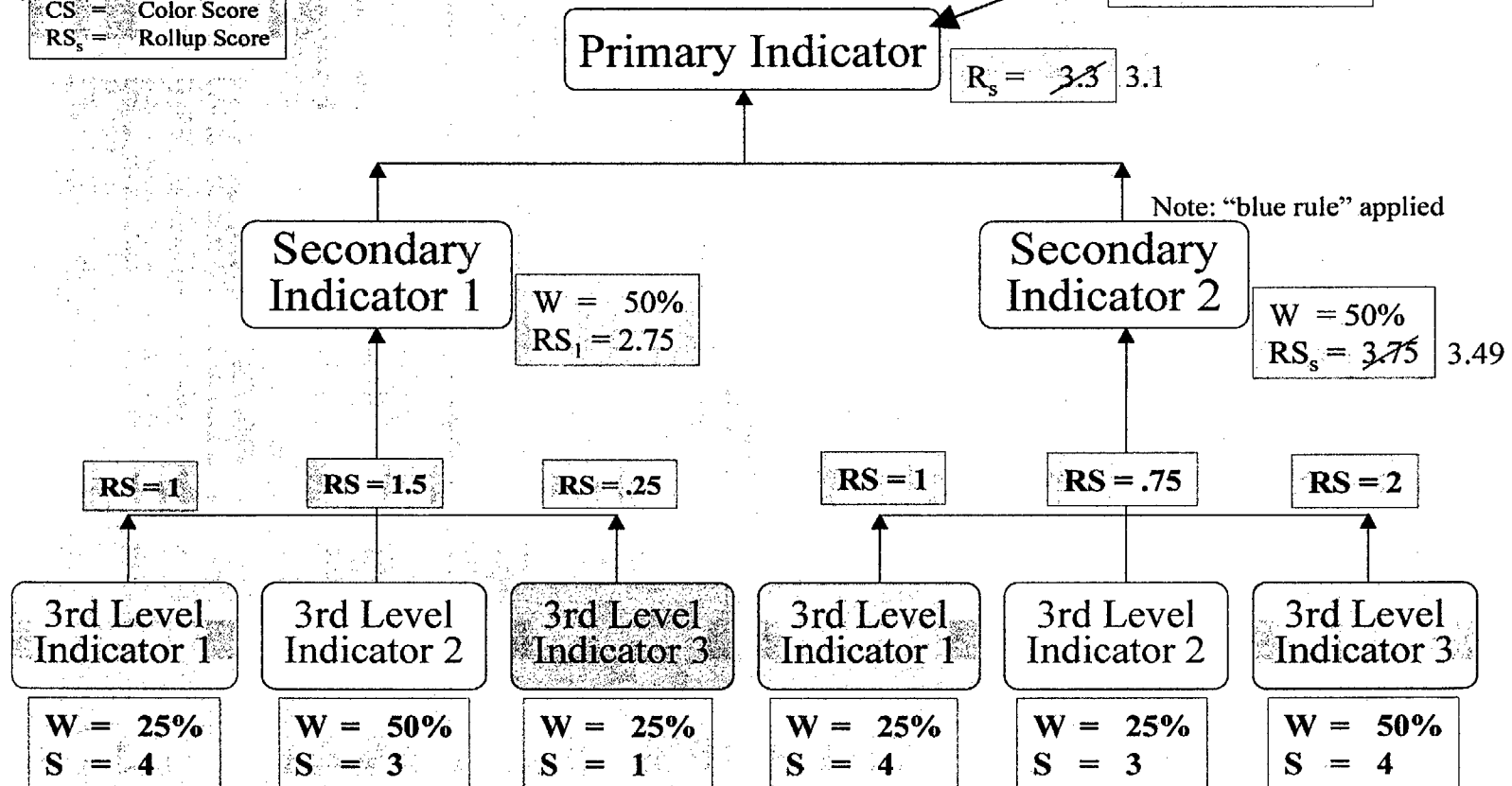
Roll-Up Methodology

$$R_s = (W \cdot CS) + (W \cdot CS) + (W \cdot CS) + \dots$$

W = Weight
CS = Color Score
RS_s = Rollup Score

Rollup Scores (RS)
for all Indicators

3.5 ≤ Blue = 4
2.5 ≤ Green < 3.5
1.5 ≤ Yellow < 2.5
1.5 < Red





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www.ocrwm.doe.gov

Examples of Specific Performance Indicators: Licensing, Corrective Action Management Program, Human Performance and Quality Assurance

Presented to:

DOE/NRC Performance Indicators Technical Exchange

Presented by:

Steve Cereghino

Michael Carmichael

Cindy Wagner

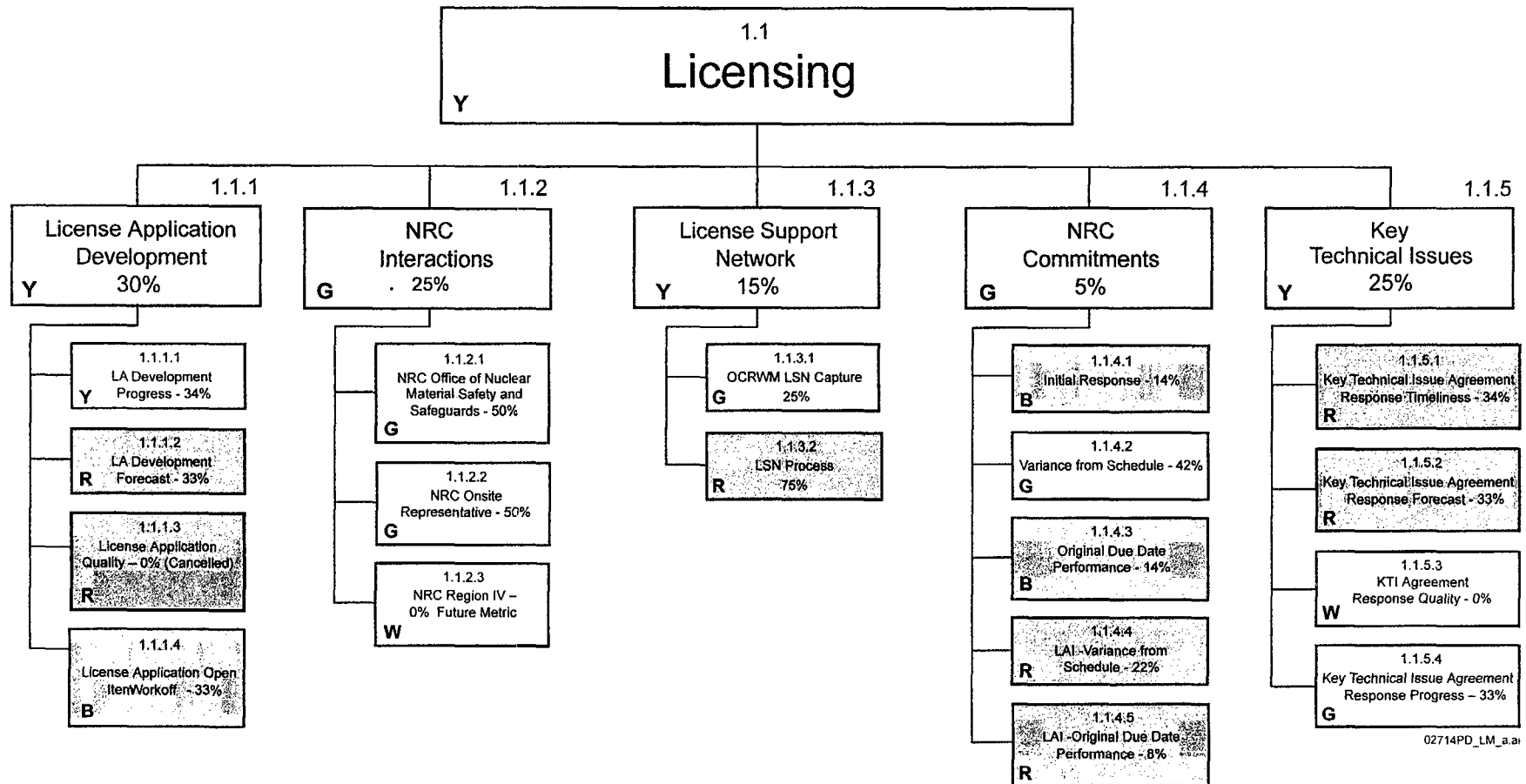
Gary Grant

Bechtel SAIC Company, LLC

May 3, 2004

Las Vegas, Nevada

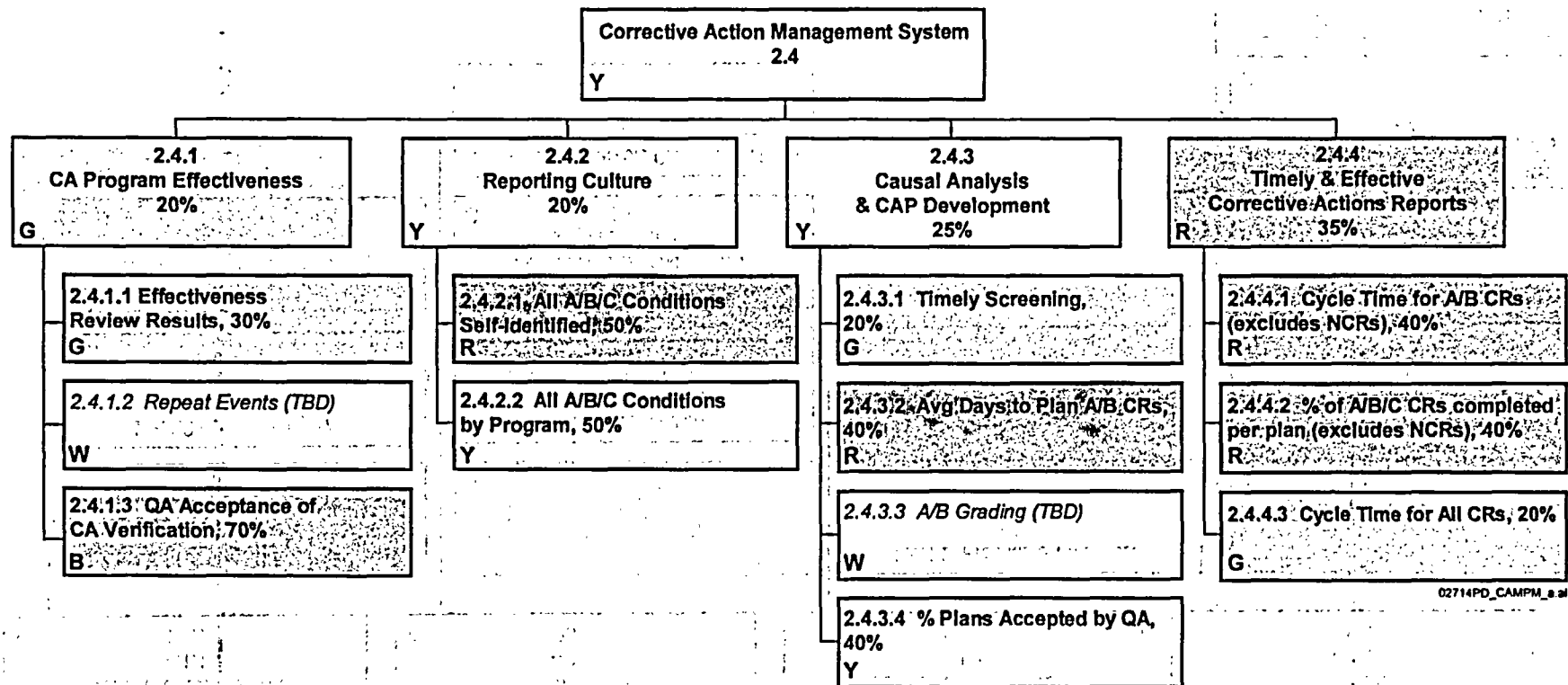
Example Performance Indicators



Presented by: Steve Cereghino



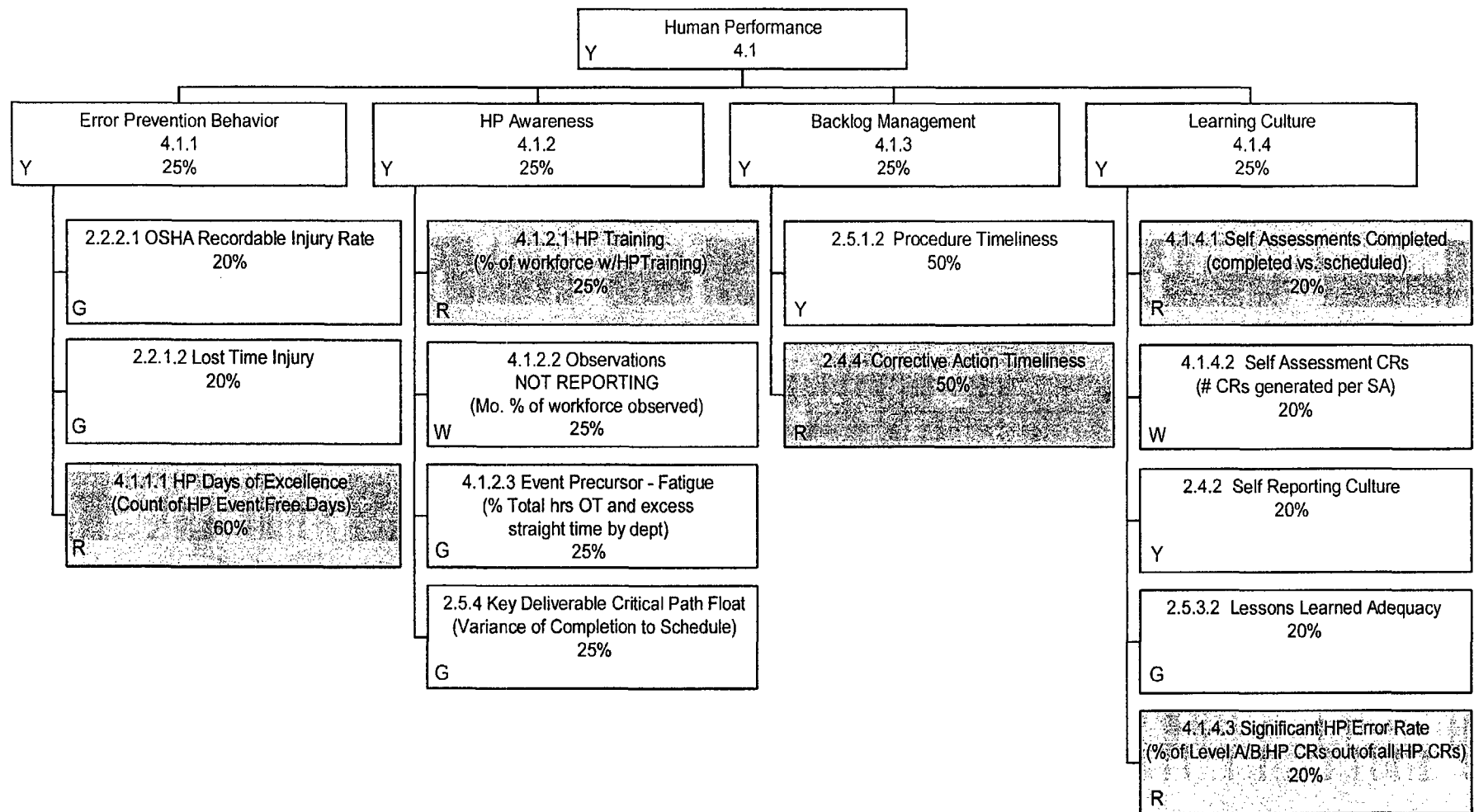
Example Performance Indicators



Presented by: Michael Carmichael



Example Performance Indicators

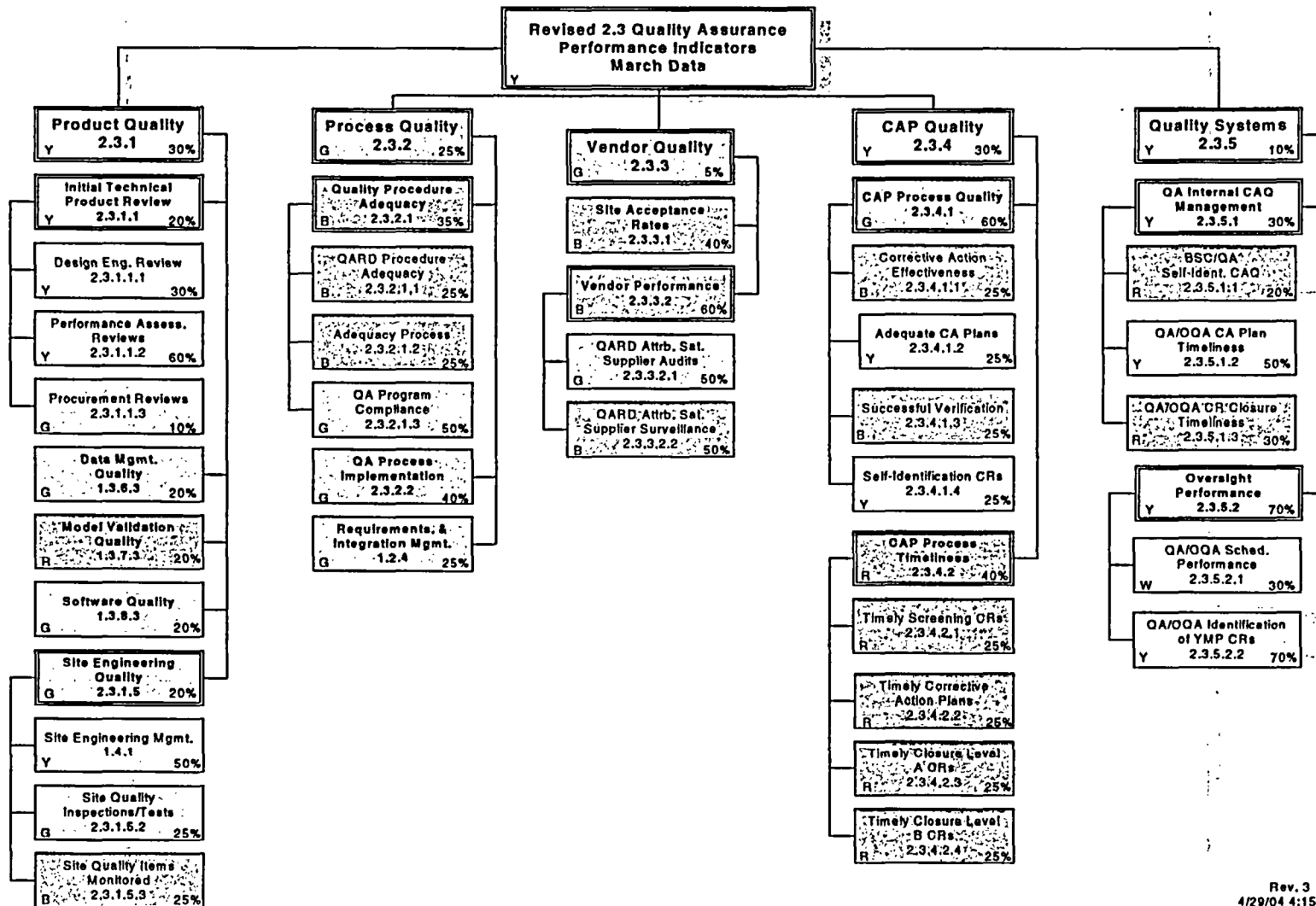


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Presented by: Cindy Wagner



Example Performance Indicators



Rev. 3
4/29/04 4:15 PM

Presented by: Gary Grant

